



# RDECOM-TARDEC

## Briefing to Industry Development of Ground Vehicle Fuel Cell Auxiliary Power Units (APUs)

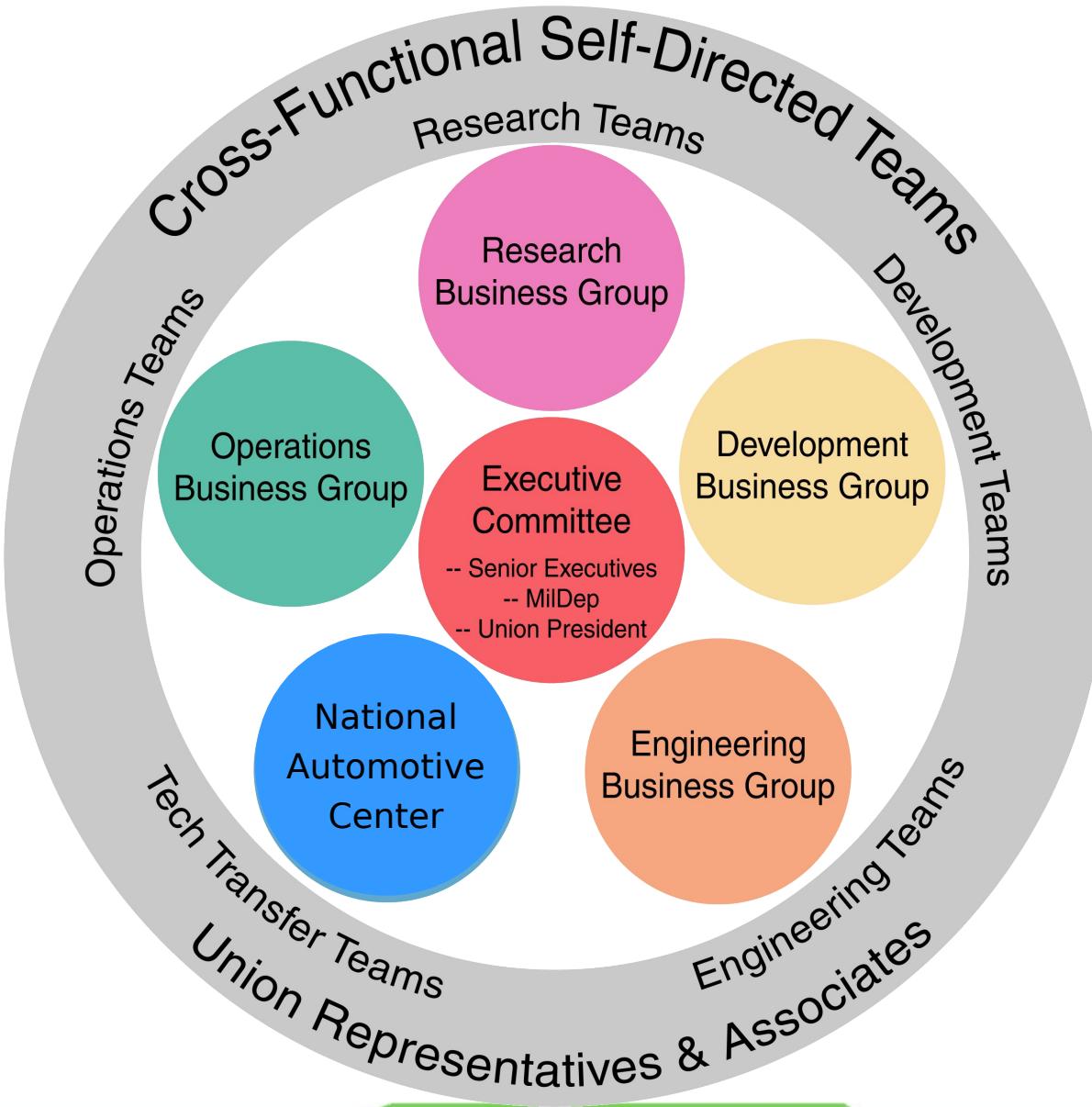


**02-03 November 2004  
At the 2004 Fuel Cell Seminar  
San Antonio, TX**

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# Introduction

- In July 04, U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) secured Army Science & Technology funding for a multi-year program to develop fuel cell Auxiliary Power Unit technology for ground combat vehicles
  - The program focuses on a brass board APU demonstration in FY08
  - The APU must fit and operate in combat vehicles, and use JP-8 fuel
- This briefing gives potential participants in the program an overview of the program's goals, and potential contracting strategy and schedule

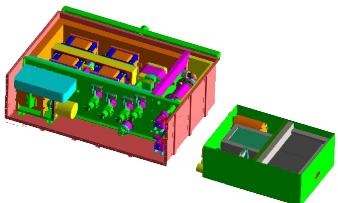
# TARDEC Fuel Cell APU History

**1998**



Fuel cell integration in a conventional drive heavy duty

**2002**



SOFC APU and reformer development



PEM APU and methanol and synthetic diesel reformer development

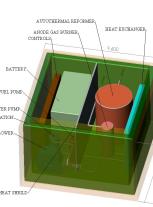


Regenerative PEM APU proof of concept

**2004**



SOFC reformer development



Microchannel distillation and HDS development



Microlith JP-8 gasifier and pre-reformer



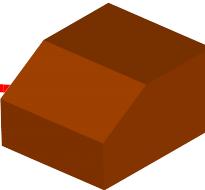
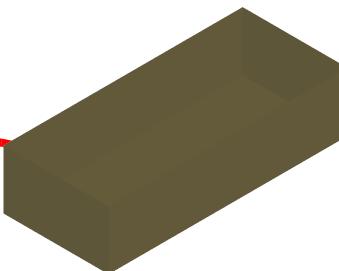
Prototype integration of an microtech and PEM based low S APU

Regenerative PEM APU functional integration

# APU System Design Philosophy

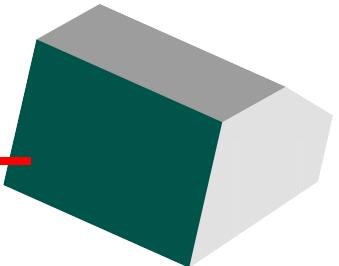
- Commonality of Components
- Scalability between and within vehicle classes
- Modular design and construction
- Minimal logistics impact

# Fuel Cell APU Vehicle Under Armor Space Availability



Left Sponson installation,  
approx volume  $0.2 \text{ m}^3$   
(30.5cm H x 53.3cm W x  
124.5cm L)

Right Sponson installation,  
approx volume  $0.07 \text{ m}^3$   
(38cm H x 45.7cm W x  
43cm L)



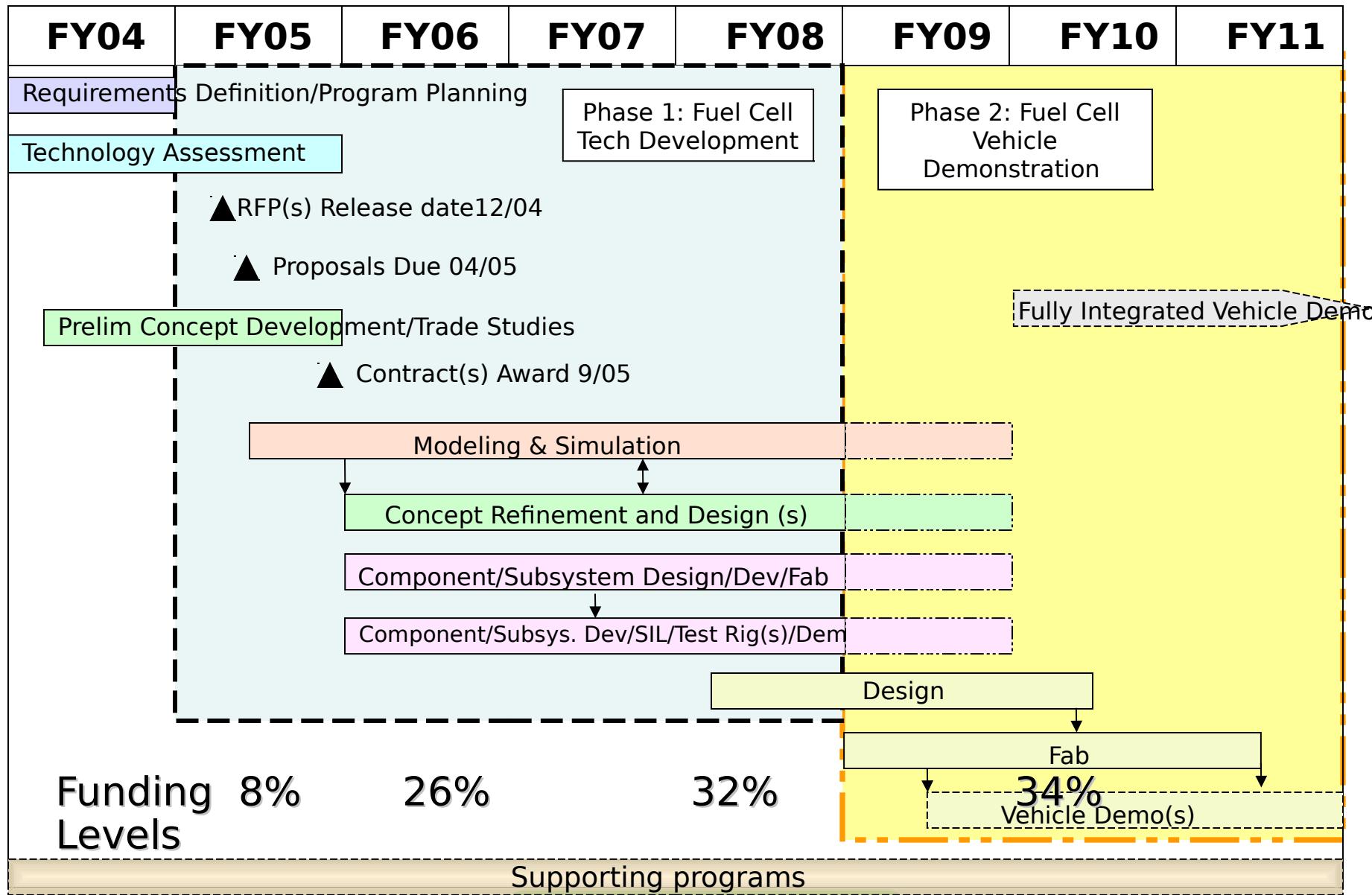
Right Nose installation,  
approx volume  $0.2 \text{ m}^3$

# Target Requirements

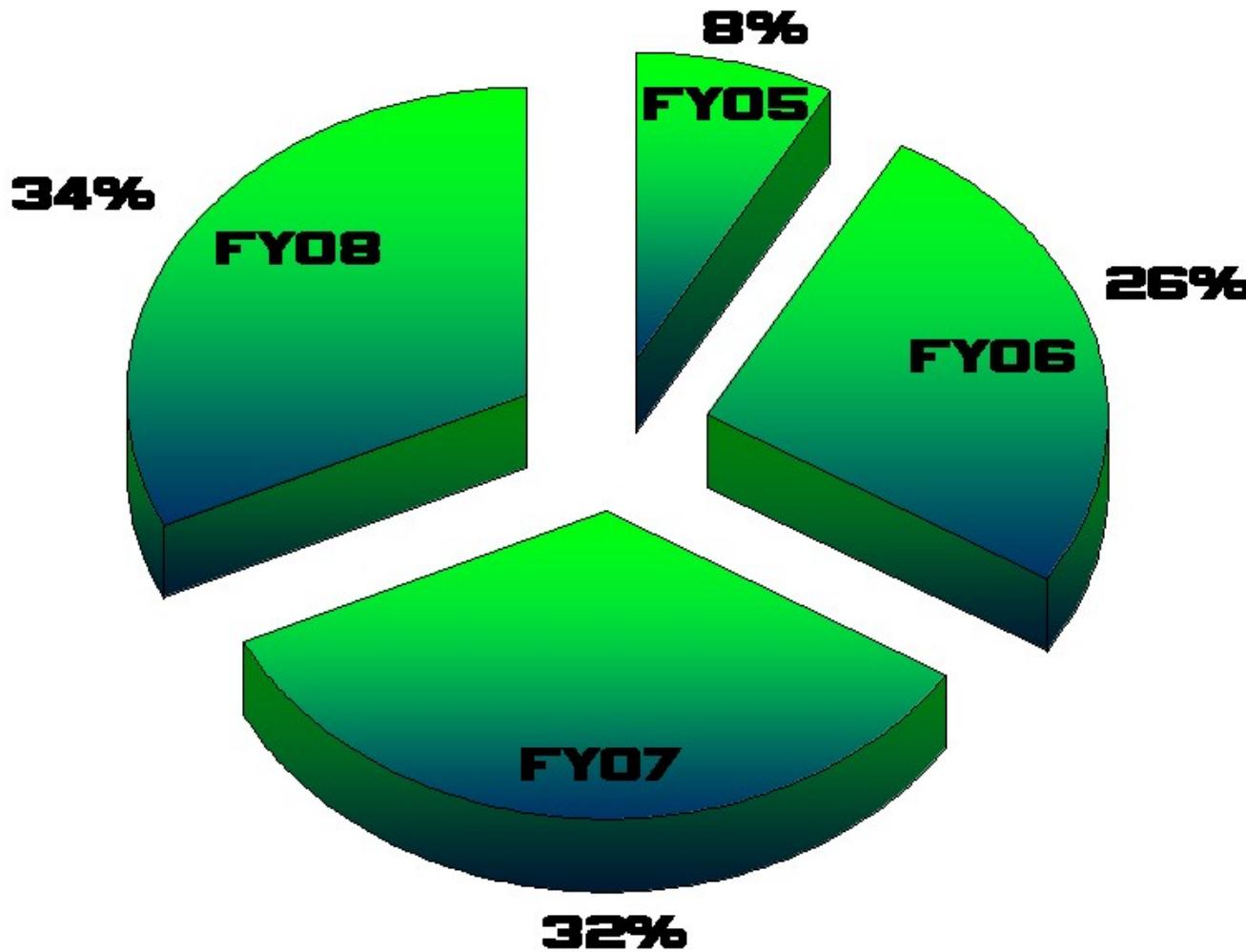
- Basic Requirements
  - Continuous power output range 5-20 kW
  - Volumetric Size = Approx 200 liters, vehicle dependent
  - 5,000 hr life, with 2,500 hr major maintenance interval
  - 10:1 turndown
  - Minimized acoustic output
  - Minimized thermal signature
- Environmental Requirements (Consistent with MIL-STD 810F)
  - Start and Operate at -18-49°C
  - Survive freezing during storage/transport

# Interfaces

- Inputs
  - Worldwide JP-8 fuel (sulfur level and aromatic levels vary widely - MIL-DTL 83133E)
  - Ambient air
  - 28VDC power
  - No externally supplied water
- Outputs
  - 28VDC power
  - Waste exhaust



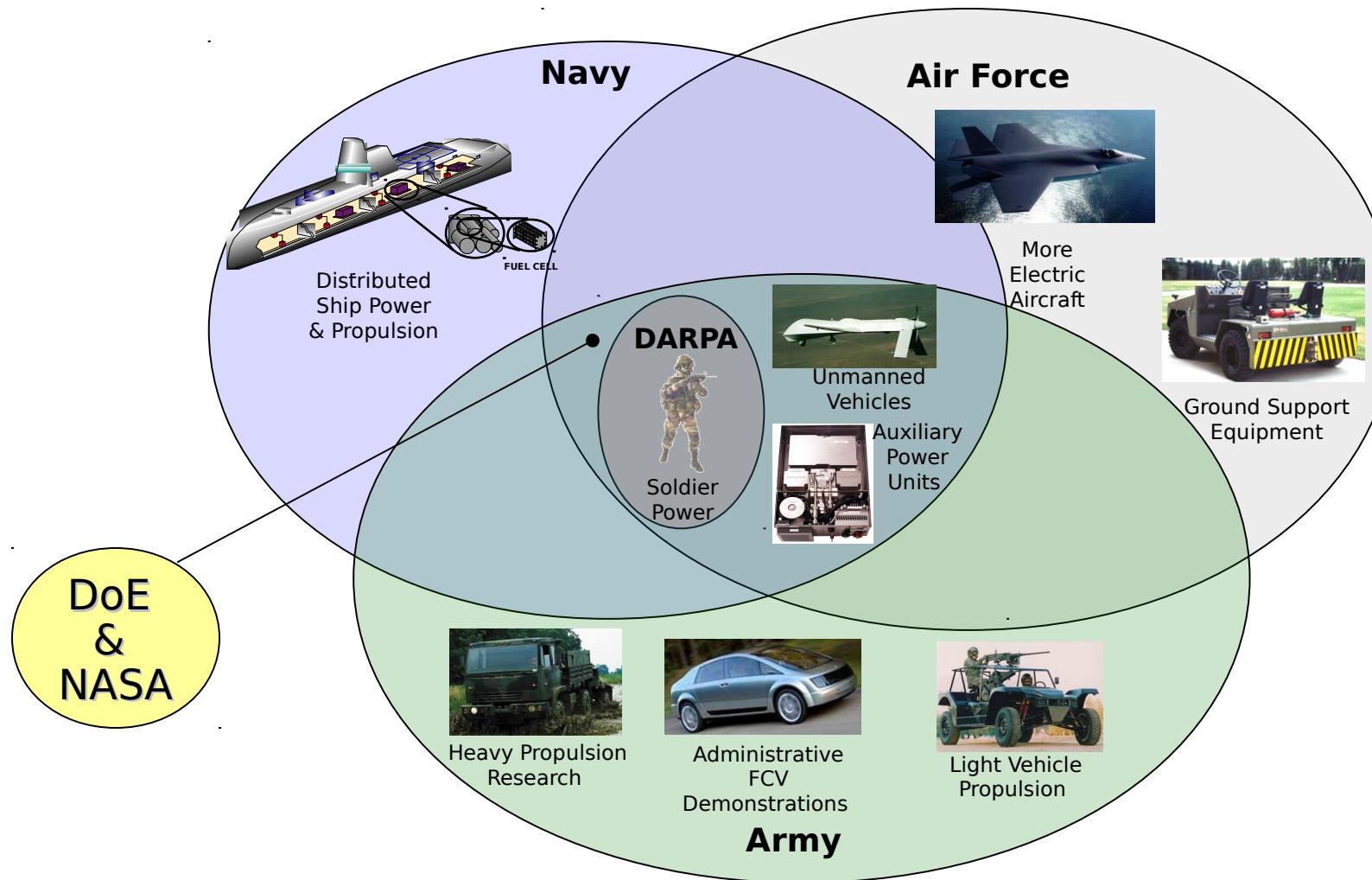
# Distribution of Funds



# Collaborative Efforts

- ARL and CERDEC are partners to the current effort. These centers as well as TARDEC report to the Army's Research, Development and Engineering Command.
- The team is dedicated to fostering inter-service and inter-agency cooperation to meet our goals.
- We are exploring areas of joint interest with:
  - Army Corps of Engineers CERL
  - Department of Energy - Fossil Energy
  - Department of the Navy - ONR
  - Air Force Research Lab
  - NASA - Glenn Research Center

# Federal Fuel Cell Collaboration Areas



# Acquisition Strategy

- We are planning to solicit for Offerors that can deliver a full brass board of an APU
- We may make up to three awards, but will reserve the right to make none
- Offerors will have to propose their approach to meet a common statement of objectives and clearly demonstrate the basis for their claims

# Acquisition Strategy

- The program will likely be phased
  - Phase I is the currently approved program, FY06-08
    - Part A, component development and validation
    - Part B, brass board build and test
  - Phase II, is a possible follow-on effort for vehicle integration
- Technical evaluation will be based on the likelihood to meet the target requirements
  - The RFP will reflect the final requirements
- The proposal will be evaluated for cost
- Final evaluation criteria will be reflected in the final RFP
- A single contractor shall be competitively down selected from the phase 1 contractors

# Q & A Information

The responses to your questions will be posted here.

## TACOM-Warren's PRO-NET

(<http://contracting.tacom.army.mil/ssn/sources.htm>  
)

*under*

## **USRDECOM - TARDEC Fuel Cell Industry Day Announcement - 05-2**

For additional after conference questions please email  
them

to

TARDECFuelCellIPT@tacom.army.mil

# Important Dates

Release of the RFP (12/04)

Proposals Due (04/05)

Source Selection (06/05)

Contract Award (9/05)